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(56) Documents cited  
GB 2209147 A GB 2178161 A WO 82/02483 A  
US 4989729 A US 4895135 A US 3970068 A

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(54) A rapid cooling or heating device for a can

(57) A rapid cooling or heating device 1 for a can 2 comprises a sealed container 3 connected to the inner wall of the bottom cover 10 of can 2. In the container 2 are two separated chemicals 4, 5. A stirring device 6 can be operated to rupture a barrier separating the two chemicals and to mix the chemicals together. In use, it is merely necessary to remove hood 7 and push a button 15 extending out of the bottom cover 10 of can 2 to operate device 6 and mix chemicals 4, 5 with each other, whereby an intense chemical reaction will be caused and a large amount of heat energy will be absorbed or released, thereby cooling down or heating up the food or beverage in the can.

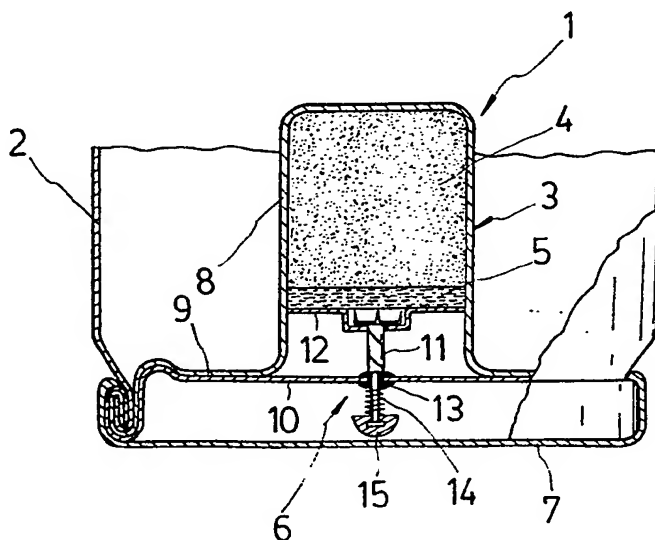


FIG. 2

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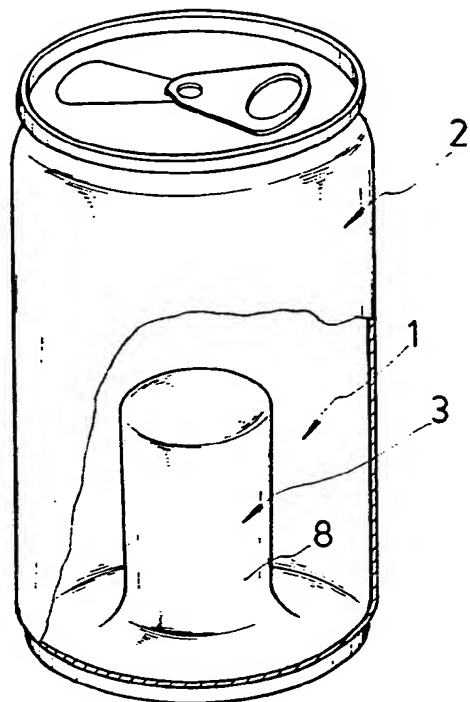


FIG. 1

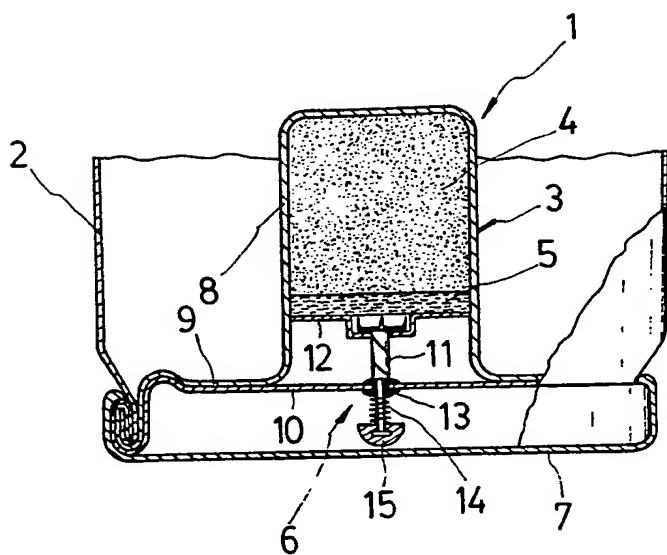
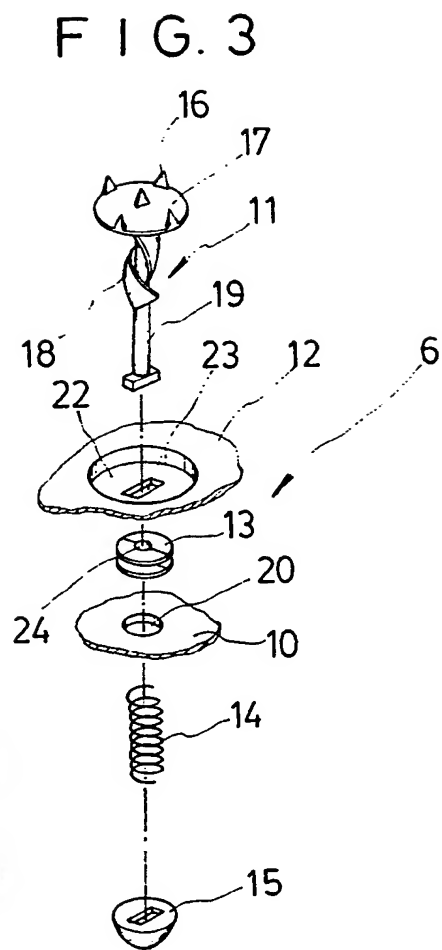


FIG. 2



## DESCRIPTION OF INVENTION

Title: "A rapid cooling or heating device for a can"

THIS INVENTION relates to a cooling or heating device for a can, and particularly to a self-contained cooling or heating device in a can, by means of which a food or beverage in the can may be cooled down or heated up to make it more fit to eat or drink and to retain the original flavour as well.

Nowadays, canned foods and beverages are very popular because they can be stored easily and for long periods and can easily be carried along in various field activities. However, some canned foods and beverages are unpalatable at normal ambient temperature and must be cooled down or heated up to become palatable and to provide their original flavour. Cool drinks are often required especially after sport. On the other hand, in cold weather, or in mountain climbing, for example, there is a need for hot food and drink. However, the conventional can is incapable of meeting these requirements without some external cooling or heating facility. Improvement of it is necessary therefore.

An object of this invention is to solve the above-noted drawback of the conventional can by providing a can having a self-contained rapid cooling or heating device. In a preferred embodiment, an elongate sealed container is provided with the can, the outer wall of the container being in direct contact with the canned food or beverage in the can. Two separated chemicals are included in the container. In use, a stirring device in operation mixes the chemicals to generate an intense chemical reaction wherein a large amount of heat energy would be absorbed or

released, thereby resulting in cooling down or heating up of the food or beverage in the can.

An embodiment of the invention is described below, by way of example, with reference to the accompanying drawings, wherein:-

FIGURE 1 is a cutaway view of a can showing shape and location of a sealed container therein;

FIGURE 2 is a cutaway view of the lower part of the can of Figure 1, with the upper part omitted, and

FIGURE 3 is an exploded view of a stirring device visible in Figure 2.

As Figures 1, 2 show, a rapid cooling/heating device 1 is connected to the lower end of can 2 and comprises a container 3, chemicals 4, 5, a stirring device 6 and a protective hood 7. Container 3 is manufactured by pressing stainless metal of good heat-transfer characteristics and is in the form of an elongated round barrel 8 sealed at one end. The periphery of the other open end of round barrel 8 is extended outward to be a joint face 9 perpendicular to round barrel 8, which overlappingly connects with bottom cover 10 of can 2 and positions container 3 in the centre. The outer wall of container 3 is in direct contact with the canned food or beverage and can, therefore, facilitate heat energy exchange between the chemicals and the can contents.

Container 3 contains two separated chemicals 4, 5. One chemical 4 is in the form of powder, while the other chemical 5 is in liquid form and packed in a sealed bag which is easily pierced open to allow chemical 5 to mix

with chemical 4 to cause intense chemical reaction. Chemicals 4, 5 (see Figure 2) could be quicklime powder and water, or a mixture of powders of nitric acid amines and sodium chloride and water, or any other two sorts of suitable chemical kept separate and in a stable state.

Between the round barrel lower part beneath chemicals 4, 5 and bottom cover 10 is connected a stirring device 6 consisted of stirring rod 11, obstruction piece 12, sealing lock 13, spring 14 and button 15 (as Figures 2, 3 show). The front end of stirring rod 11 is arranged with a few stirring blades 16 each having a pointed end in the front for piercing sealed bag of liquid chemical 5 and the rear ends of which blades connect with a connection piece 17. The back of connection piece 17 connects with a spiral strip 18 which, as it passes through revolution-driving hole 20 in the centre of obstruction piece 12, will cause connection piece 17 to rotate as it moves forward, thereby bringing stirring blades 17 to fulfil their piercing and stirring functions in the end.

Behind spiral strip 18, there is provided a T-shaped round rod 19 which extends out of bottom cover 10 of can 2 and extends sealingly through a seal or grommet 13 fitted sealingly in a circular hole 20 in bottom 10 of can 2 to allow operation of the stirring device from the outside of can 2. Obstruction piece 12 is circular and is connected to the inner wall of the container lower part. The centre of piece 12 includes a circular recess 22 in which the stirring blades 16 and connection piece 17 of stirring rod 11 settle so as to prevent stirring blades pointed ends from contacting the sealed bag of liquid chemical 5 when stirring rod 11 is not in operation. The centre of the recess 22 includes a small, rectangular revolution-driving hole 20 having a length corresponding to

the width of spiral strip 18 and a width greater than the spiral strip's thickness. In the central area of revolution-driving hole 20, there are provided a pair of extended operating points 23 in opposition so that spiral strip 18 when passing therethrough is caused to move forward in a spiralling or rotating fashion. Sealing lock 13 is made from material of good heat-transfer characteristics. The central hole 24 of sealing lock 13 is slightly smaller in diameter, in a relaxed state, than T-shaped round rod 19 so as to provide a sealing function with respect to the T-shaped round rod 19 extending therethrough. T-shaped round rod 19, extending out of bottom cover 10 of can 2, is sheathed with spring 14 and connected with button 15 at the end. Button 15 is hollow inside, and a pivoted connection between T-shaped round rod 19 and button 15 is formed after the T-shaped round rod end is squeezed into button 15. Thus T-shaped round rod 19 may revolve once button 15 is pushed. As is shown, the outside of bottom cover 10 of can 2 is covered with a protective hood 7 so that button 15 can be prevented from being struck by accident.

The user merely has to put can 2 upside down and remove protective hood 7 to begin use. Just after button 15 is pushed by user's finger one or more times, stirring blades 16 which then leave recess 22 and move revolving forward will pierce open sealed bag of liquid chemical 5 and cause an intense chemical reaction in which a large amount of heat energy will be absorbed or released, thereby cooling down or heating up the food or beverage in the can.

## CLAIMS

1. A cooling or heating device for a can comprising a protrusion extending into the interior of the can and defining, within said protrusion a cavity containing two different chemicals capable of reaction endothermically or exothermically together, rupturable barrier means separating said two chemicals in said cavity and means operable manually to rupture said barrier means and mix said chemicals together, thereby to initiate a heat absorbing or emitting reaction whereby heat will pass to or from said cavity from or to the interior of the can via the wall of said protrusion.

2. A cooling or heating device for a can, the device being connected to the inside of the can in the lower end of the can and comprising a container, two chemicals capable of reacting together, a stirring device and a protective hood, the container being in the form of an elongate round barrel sealed at one end and which extends outwardly perpendicular to the axis of the round barrel and which is connected along with the bottom cover of the can to the lower end of the wall of the can, whereby said container adopts a position at the centre of the can's lower end, said two chemicals being kept in a separate and stable state in said container and wherein between the underside of a space, defined in said container, which accommodates said chemicals, on the one hand and the can's bottom cover on the other hand is disposed a stirring device having an operational button extended out of the bottom cover and which, if pushed, will cause the mixing of the two chemicals and an intense chemical reaction in which a large amount of heat energy will be absorbed or released.

3. A cooling or heating device according to claim 2, wherein the outer wall of said container is in direct contact with the canned food or beverage.

4. A cooling or heating device according to claim 2, wherein one said chemical is in the form of powder in said container, the other said chemical being in liquid form and packed in a sealed bag in said container, and said chemicals are adapted for easy thorough mixing.

5. A cooling or heating device according to claim 2, wherein said stirring device consists of a stirring rod, an obstruction piece, a sealing lock, a spring and a button, wherein, the front end of said stirring rod has a plurality of stirring blades each of which has a pointed front end, the rear ends of said blades being connected to a connection piece having a spiral strip connected to its rear side which extends out of said obstruction piece through an aperture in the centre of said obstruction piece, a round rod, which is connected to said spiral strip, being extended out of said bottom cover of can and sheathed with a spring and carrying said button at the lower end of said rod, remote from said blades, said obstruction piece being connected to the inner wall of said container's lower part and having a circular recess provided in the centre in which said stirring blades and said connection piece of the stirring rod are located before operation of said button, said aperture in said obstruction piece being a rectangular aperture in the centre of said recess, so dimensioned as to act as a nut relative to the screw formed by said spiral strip whereby forced axial movement of said stirring device relative to said obstruction piece will produce simultaneous rotation of the stirring device.



6. A cooling/heating device according to claim 5 wherein the length of said rectangular aperture corresponds to the width of said spiral strip and the width of the aperture is greater than the thickness of said spiral strip and a pair of extended operating points are in opposition in the central area of the said aperture whereby said spiral strip will be rotated whilst passing through said aperture.

7. A rapid cooling or heating device for a can, substantially as hereinbefore described with reference to the accompanying drawings.

8. Any novel feature or combination of features described herein.

**Patents Act 1977**  
**Examiner's report to the Comptroller under**  
**Section 17 (The Search Report)**

Application number

9124060.6

**Relevant Technical fields**

- (i) UK CI (Edition K ) F4X(X2)  
F4H(H3,H7)
- (ii) Int CI (Edition 5 ) F24J 1/00 A47J 36/28  
F25D 3/08

Search Examiner

ALEXANDER G SMITH

**Databases (see over)**

(i) UK Patent Office

(ii)  
ONLINE DATABASE(S) : WPI

Date of Search

27 FEBRUARY 1992

Documents considered relevant following a search in respect of claims

1

Category (see over)	Identity of document and relevant passages	Relevant to claim(s)
X	GB 2209147 A (DAIWA CAN CO) see lines 11-16 on page 8	1
X	GB 2178161 A (TOYO JOZO KK) see pierler 18	1
X	WO 82/02483 (OSTEVRATH)	1
X	US 4989729 (HEANG) see lines 40-55 in column 2	1
X	US 4895135 (HAMASAKI)	1
X	US 3970068 (SATO) see lines 39-54 in column 2	1

SF2(p)

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Category	Identity of document and relevant passages	Relevant to claim(s).

### Categories of documents

**X:** Document indicating lack of novelty or of inventive step.

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